Remarks

The present amendment responds to the Official Action dated July 13, 2004. A petition for a one month extension of time to respond and authorization to charge Deposit Account No. 50-1058 the large entity extension fee of $ 110 accompany this amendment. The Official Action indicated the information disclosure statement filed September 21, 2001 did not comply with 37 CFR 1.98(a)(2). The Official Action objected to claim 20. The Official Action also rejected claims 1-19 under 35 U.S.C. 103(a) based on Matt et al. U.S. Patent No. 5,909,489 (Matt). These grounds of rejection are addressed below. Claim 1 has been canceled, claims 2-20 have been amended to be more clear and distinct, and a new claim 21 has been added. Claims 2-21 are presently pending.

Information Disclosure Statement

A new information disclosure statement (IDS) is enclosed herewith to address the non compliance of the September 21, 2001 IDS. Please note that the book, R. E. Crochiere, L. R. Rabiner, "Multirate Digital Signal Processing," Prentice-Hall, 1983 should be available through the USPTO reference library and consequently is not included in this IDS.

Amendments to the Specification

Paragraph [0040] is amended to remove symbol: G_{MAX}: Maximum Allowable Total Gain since the symbol is not used in FIG. 3 as indicated in paragraph [0040].

Paragraph [0041] is amended to add the G_{MAX} symbol definition "maximum allowable total gain".

Paragraph [0048] is amended to correct an error in stating how the total gain is created. The sentence: " The resulting gain, G_N, from NGC gain unit 101 is added to the gain, G_A, from AGC gain unit 100 to form a total gain, G_{TOT}." is changed to " The resulting gain, G_N, from NGC gain unit 101 is ~~added~~ multiplied ~~to~~ with the gain, G_A, from AGC gain unit 100 to form a total gain, G_{TOT}." Support for this change is found, for example, in Fig. 3, where the total gain G_{TOT} is a multiplication, indicated by multiplication symbol ⊗, of the inputs G_A and G_N . Also, paragraph [0041] indicates "... the total gain of compander 23 shown in FIG. 3 is calculated as follows: $G_{TOT} = G_A \cdot G_N$ "

Paragraph [0070] provides additional support for the change. Paragraph [0070] states: "Referring back to FIG. 3, it can be seen that the total gain G_{TOT}, is generated by multiplying the gain G_N generated by NGC gain unit 101 with the gain G_A generated by AGC gain unit 100."

Paragraph [0052] is amended to remove a typographical error. The letter "a" has been removed from the last sentence of paragraph [0052].

Paragraph [0053] is amended to identify the curves of Fig. 7 as curves A', B', and C'.

Paragraph [0057] is amended to correctly identify the intersection point consistent with Fig. 2 and the specification's discussion of this Fig.

In paragraph [0069], the curves labeled A, B, and C of the last sentence of paragraph [0069] have been relabeled A", B", and C" to differentiate the curves of Fig. 10 from the curves labeled A, B, and C of Fig. 4.

Paragraph [0073] is amended to correct typographical errors in referencing units in Fig. 12. Fig. 12 illustrates unit 2200 as a level detector and unit 2000 as an expander. Reference to unit 2200 as an expander is amended to correctly reference the unit 2000 as the expander in two places in paragraph [0073]. In the first location to be changed, the second sentence of paragraph [0073] is amended: "For example, compander 230 comprises both near- and far-end noise estimators 4000,5000, and AGC gain unit 1000, and NGC gain unit 1001, expander, compressor and limiter gain units ~~2200~~2000,2300,2500 along with a master gain unit 2400." In the second location to be changed, the sixth sentence of paragraph [0073] is amended to read: "For one thing, attack and release control unit 2323 is associated with both the expander and compressor gain units ~~2200~~2000, 2300." Also, it was inadvertently stated that "...units 100, 101, 200-500 shown in FIG. 3 also comprise attack and release control units..." Master gain unit 400 should not have been included in this group since the corresponding master gain unit 2400 of Fig. 12 does not illustrate the use of an attack and release control. This inadvertent error is corrected by amending the text to read "...units 100, 101, 200, 300, and 500 shown in FIG. 3 also comprise attack and release control units..." Also, Fig. 3 illustrates unit 200 as an expander. The seventh sentence of paragraph [0073] is amended to properly reference the expander as unit 200: "As envisioned by the present invention, the compander 23 shown in Fig. 3 would necessarily use separate attack and release control units for each of the expander and compressor gain units 200,300,~~500~~."

Claim Objections

The Official Action objected to claim 20 requesting the parent claim be changed from claim 11 to claim 16. Claim 20 has been so amended.

The Art Rejections

The Official Action rejected claims 1-19 under 35 U.S.C. 103(a) based upon Matt. It is clear the rejection based upon Matt is not supported by a careful reading of that reference and the rejections based thereupon should be reconsidered and withdrawn. Further, the Applicant does not acquiesce in the analysis of Matt made by the Official Action and respectfully traverses the Official Action's analysis underlying its rejections.

Matt discloses a line echo suppressor circuit for a speech communication system. The Matt line echo suppressor circuit uses a compander whose characteristic signal response is adjusted based on a measure of the noise level on the receive path, coupling strength between the transmit and receive path, or the speech level which ever is dominant. Matt, col. 5, lines 23-26, and col. 7, lines 18-21. Matt does not disclose and does not make obvious a "... compressor gain control unit adaptively adjusting a far-end signal compression range based on the near-end noise level estimate to adaptively compress the far-end signal to compensate for noise...", as claimed in claim 1 of the present invention. Matt uses a maximum value decision circuit 3.8 for determining dominant signal control of compander characteristics. Matt uses this approach to suppress the effects of line echoes, when for example, the compander characteristics are changed after speaking has stopped so that expected line echoes can be surpressed. Matt col. 8, lines 15-21. The characteristics of Matt's compander are changed by shifting the compander

characteristics according to a "maximum value decision circuit". Matt, col. 7, lines 18-21. The shifting of a fixed compander characteristic operating curve is shown in Matt's Fig. 3a. Such shifting does not adjust a compression range of operation that occurs prior to a limit, such as the 0dB limit shown in Fig. 3a.

In contrast, the present invention describes the use of a near-end noise level estimator to effect control of a compressor gain control unit to adjust a compression range of operation. In Figs. 2 and 3, the compressor range 40 is adjusted by a near-end noise level N_Y. Variations in the compression range are also illustrated in Fig. 4, for example, where two different compression ranges a_2 and b_2 are highlighted. See also paragraphs [0036] and [0043] of the present specification, for example.

Matt controls the "steepness" of the compander characteristic by a time delayed control signal S that is a "1" if local subscriber A is silent, thereby selecting compander characteristic exp1, and is a "0" if the local subscriber A is talking, thereby selecting compander characteristic exp2. Such selection of either characteristic exp1 or exp2 is dependent upon a comparison, via comparator 3.10, of a short term average magnitude of a near-end output signal xsam with a long-term average magnitude xlam and not a noise level estimate generated by a noise level estimator. A time delay, controlled by time delay circuit 3.9, is required to change the compander characteristics when an echo is expected. Matt, Fig. 2a, col. 7, lines 51-55, and col. 8, lines 6-21. In Matt, the compander makes use of only a single integrator 3.3, "...which is a measure of the noise level in the receive path 1.5". Matt, col. 6, lines 25-28. Matt's "measure of the noise level" does not affect the selection of the compander's characteristic exp1 or exp2.

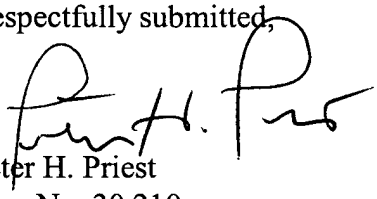
In contrast, the present invention describes the use of a far-end noise level estimator to effect control of an expander gain control unit "to adjust the amplification of low level far-end noise based on the far-end noise level estimate". See, claim 2 of the present invention, for example. In Figs. 2 and 3 of the present specification, the expander range 20 is adjusted by a far-end noise level N_X. Variations in the expander range are also illustrated in Fig. 8, for example, for three different noise levels. See also, paragraphs [0056] and [0057] of the present specification, for example.

In summary, Matt does not indicate a recognition of the problems addressed by the present invention. Further, Matt does not teach and does not suggest an apparatus which would solve the problems of adaptive noise compensation addressed by the present invention in the manner solved by the present invention as presently claimed. The claims as presently amended are not taught, are not inherent, and are not obvious in light of the relied upon art.

Conclusion

All of the presently pending claims, as amended, appearing to define over the applied references, withdrawal of the present rejection and prompt allowance are requested.

Respectfully submitted,



Peter H. Priest
Reg. No. 30,210
Priest & Goldstein, PLLC
5015 Southpark Drive, Suite 230
Durham, NC 27713-7736
(919) 806-1600

~~Troutman Sanders Mays & Valentine, LLP; J. Curtin (703) 734-4334~~

Annotated Sheet Showing Changes 7/7

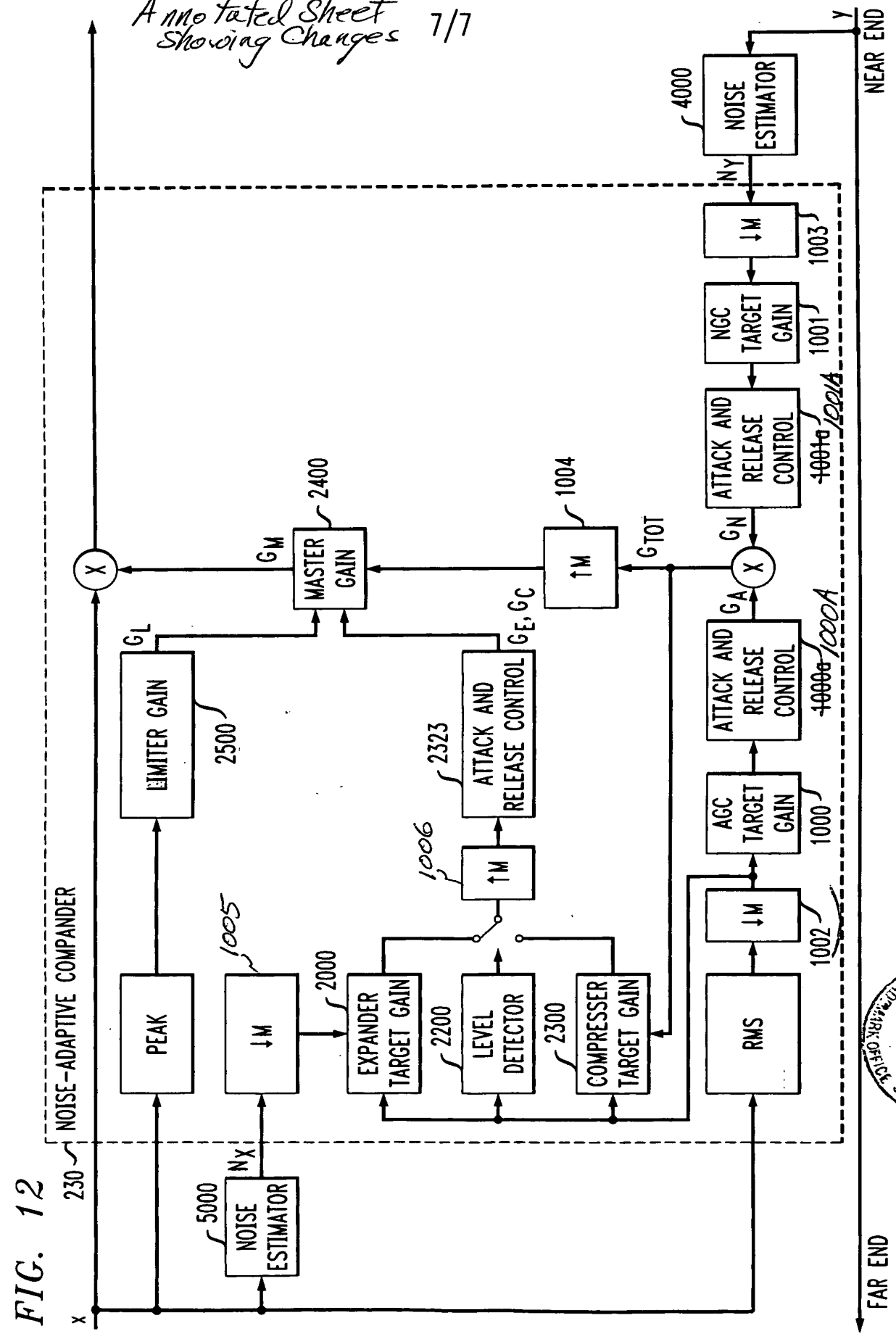


FIG. 12

Annotated Sheet Showing Changes

FIG. 10

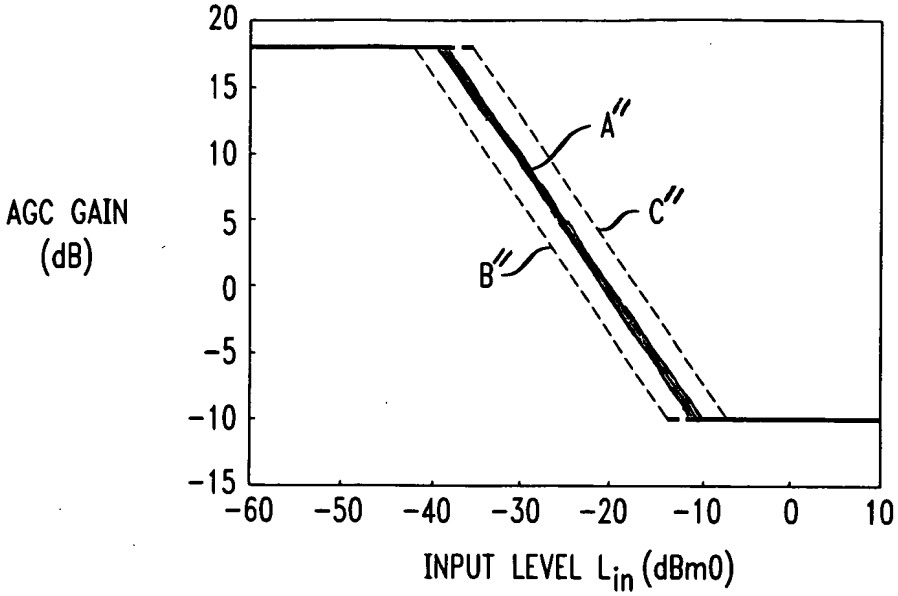


FIG. 11

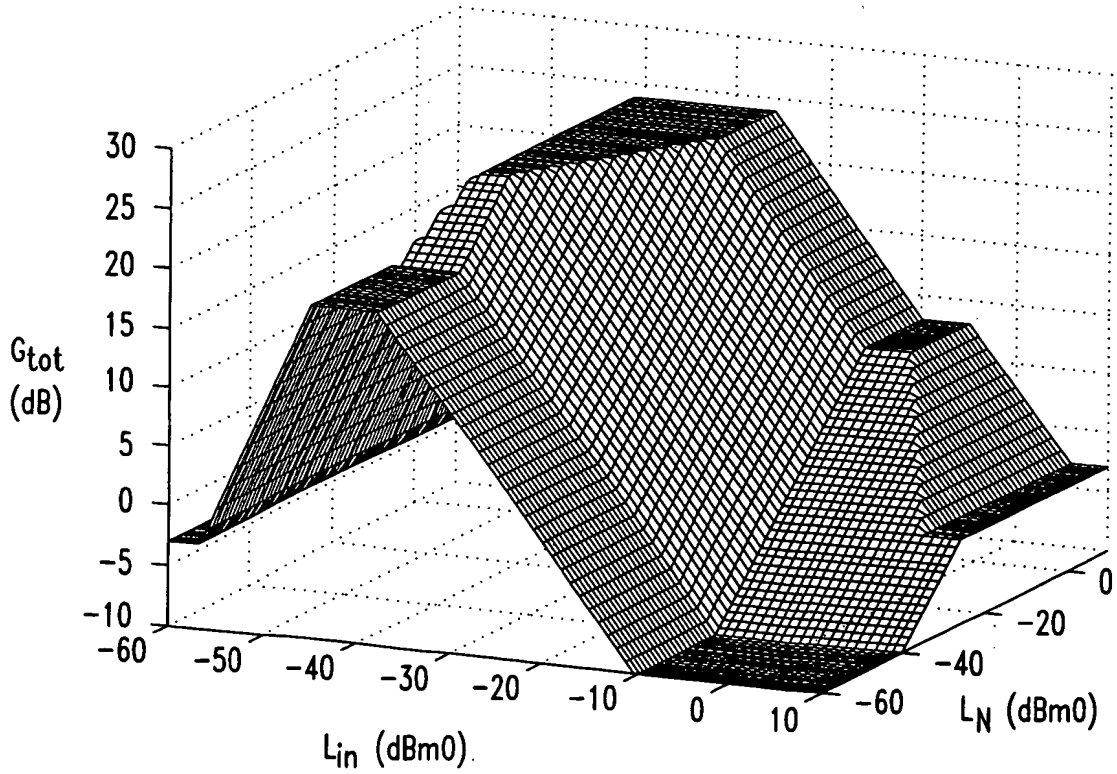


FIG. 6

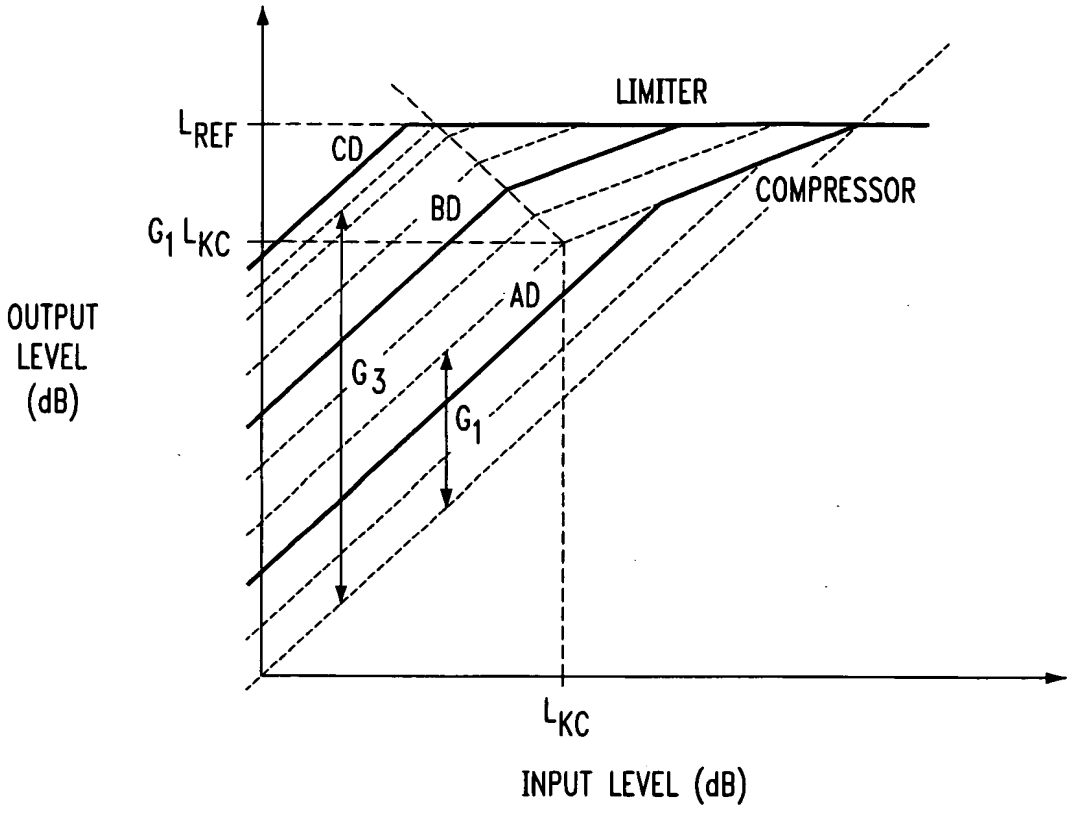


FIG. 7

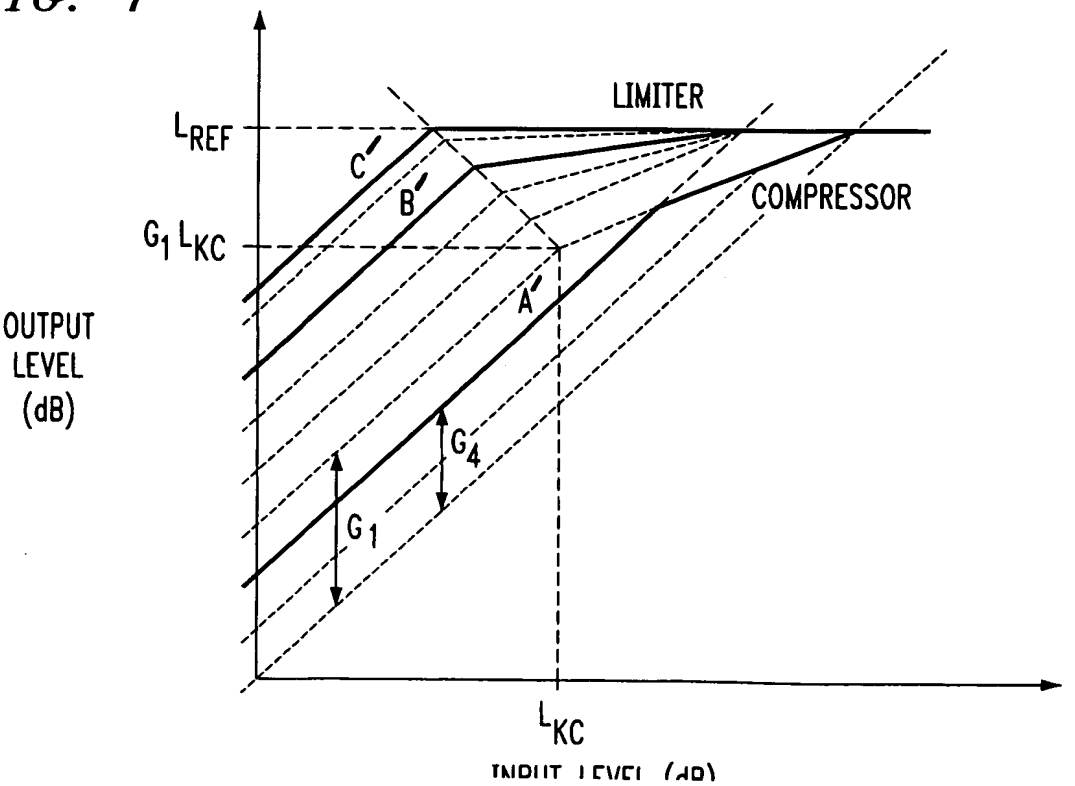


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FIG. 4

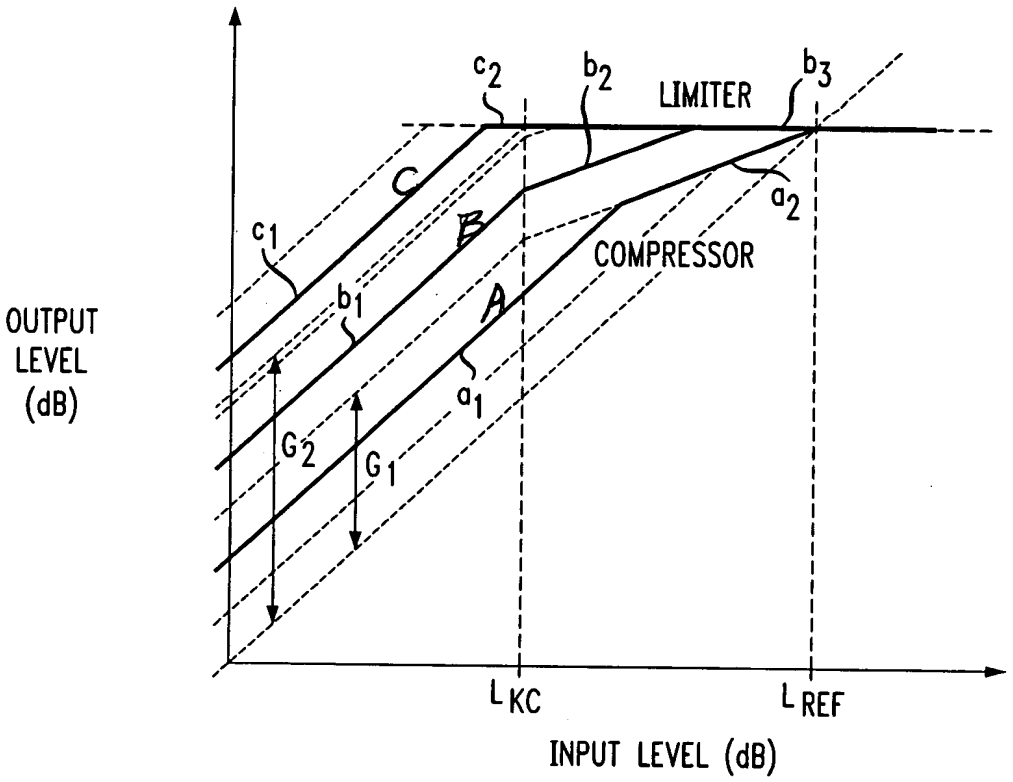

FIG. 5